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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,363	09/24/2003	Afif Osseiran	2380-781	4781

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EXAMINER
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NGUYEN, TUAN HOANG

ART UNIT	PAPER NUMBER
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2618

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/668,363	<b>Applicant(s)</b> OSSEIRAN ET AL.	
	<b>Examiner</b> Tuan H. Nguyen	<b>Art Unit</b> 2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>9/24/03 &amp; 3/11/05</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on 09/24/2003 and 03/11/2005 has been considered by Examiner and made of record in the application file.

### ***Claim Objections***

2. Claims 35 and 37 are objected to because of the following informalities: the claims are depend on themselves. Examiner assume that claim 35 depends on claim 34 and claim 37 depends on claim 34. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al (US PAT. 5,914,946 hereinafter, "Avidor") in view of Choi et al. (U.S PUB. 2004/0047403 hereinafter, "Choi").

Consider claim 1, Avidor teaches a method for use in a radio communications system with a radio base station that includes multiple antennas associated with a cell, comprising: selecting multiple mobile radios to receive a transmission over a shared radio channel during a predetermined transmission time interval (col. 1 lines 56-64).

Avidor does not explicitly show that transmitting information over the shared radio channel to the multiple mobile radios in the cell during the predetermined transmission time interval using multiple antenna beams so that interference from the transmission appears as white noise in time and in space.

In the same field of endeavor, Choi teaches transmitting information over the shared radio channel to the multiple mobile radios in the cell during the predetermined transmission time interval using multiple antenna beams so that interference from the transmission appears as white noise in time and in space (page 1 [0008] through [0010]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use, transmitting information over the shared radio channel to the multiple mobile radios in the cell during the predetermined transmission time interval using multiple antenna beams so that interference from the transmission appears as white noise in time and in space, as taught by Choi, in order to provide an adaptive interference suppression receiver that has an excellent data detection performance even in the multipath fading channel environment.

Consider claim 2, Choi further teaches the white noise is white additive Gaussian noise and one mobile radio is selected for one of the antenna beams (page 1 [0008]).

Consider claim 3, Choi further teaches the shared radio channel is a high speed-downlink shared channel (HS-DSCH) (page 1 [0010] and page 10 [0130]).

Consider claim 4, Choi further teaches receiving reports from mobile radios of a detected channel quality of a pilot signal transmitted in the cell (page 7 [0083]), and scheduling transmissions to multiple mobile radios over the HS-DSCH for each transmission time interval based on the received reports (page 1 [0010]).

Consider claim 5, Avidor further teaches selecting one of the mobile radios to receive a transmission from one of the antenna beams based on the received reports (col. 11 lines 36-48), and transmitting the information over the HS-DSCH using each antenna beam to each selected mobile radio during the predetermined share time interval (col. 1 lines 56-64).

Consider claim 6, Choi further teaches selecting an optimal coding and modulation scheme for each scheduled mobile radio to achieve an acceptable error rate (page 10 [0121] through [0122]).

5. Claims 7-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avidor et al (US PAT. 5,914,946 hereinafter, "Avidor") in view of Choi et al. (U.S PUB. 2004/0047403 hereinafter, "Choi") as applied to claims above, and further in view of Walton et al. (U.S PAT. 7,020,110 hereinafter, "Walton").

Consider claim 7, Avidor and Choi, in combination, fails to teaches splitting shared radio channel resources among the multiple mobile radios using a resource allocation scheme.

However, Walton teaches splitting shared radio channel resources among the multiple mobile radios using a resource allocation scheme (col. 40 lines 12-23).

Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Walton into view of Avidor and Choi, in order to schedule terminals for data transmission on the downlink and/or uplink based on the spatial and/or frequency "signatures" of the terminals and allocating resources in multiple-input multiple-output communication systems that utilize orthogonal frequency division multiplexing (i.e., MIMO-OFDM systems).

Consider claim 8, Walton further teaches the radio communications system is a CDMA-based system where radio channel resources include scrambling codes, each scrambling code having an associated channelization code tree, and wherein the resource allocation scheme allocates a scrambling code to the shared radio channel and allocating one or more different channelization codes associated with the shared

radio channel scrambling code to each antenna beam during the predetermined transmission time interval (col. 4 line 60 through col. 5 line 11).

Consider claim 9, Walton further teaches the radio communications system is a CDMA-based system where radio channel resources include scrambling codes, each scrambling code having an associated channelization code tree, and wherein the resource allocation scheme allocates a different scrambling code for each antenna beam during the predetermined transmission time interval (col. 40 line 60 through col. 41 line 12).

Consider claim 10, Walton further teaches the resource allocation scheme divides the shared radio channel resources evenly between the multiple mobile radios (col. 23 lines 40-44).

Consider claim 11, Walton further teaches the resource allocation scheme divides the shared radio channel resources in proportion to each mobile radio's reported detected channel quality (col. 7 lines 30-39).

Consider claim 12, Walton further teaches the resource allocation scheme divides the shared channel resources using a non-linear relationship between two or more of the following: amount of channel resources, throughput, quality of service, and

detected channel quality (col. 10 lines 40-55).

Consider claim 13, Walton further teaches the non-linear relationship is stored in a look-up table (col. 49 lines 25-45).

Consider claim 14, Walton further teaches detecting a change in radio channel conditions (col. 50 lines 25-28), and updating the look-up table based on changed radio channel conditions (col. 29 lines 24-37).

Consider claim 15, Walton further teaches the transmitting to the multiple mobile radios in the cell during the predetermined transmission time interval using multiple antenna beams prevents a flashlight effect from disrupting the channel quality detection performed by the mobile radios (col. 49 lines 14-24).

Consider claim 16, Avidor teaches a radio base station for use in a radio communications system, comprising: multiple antennas associated with a cell for generating multiple antenna beams, each beam covering only a portion of the cell (col. 1 lines 56-64).

Avidor does not explicitly show that one or more transmit buffers; and transceiving circuitry for transmitting information stored in the one or more transmission buffers over the shared radio channel via the adaptive antenna array to the multiple



mobile radios in the cell during the same predetermined transmission time interval using multiple antenna beams to spread out the interference caused by the transmission.

In the same field of endeavor, Choi teaches one or more transmit buffers (page 4 [0049]); and transceiving circuitry for transmitting information stored in the one or more transmission buffers over the shared radio channel via the adaptive antenna array to the multiple mobile radios in the cell during the same predetermined transmission time interval using multiple antenna beams to spread out the interference caused by the transmission (page 9 [0120]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use, one or more transmit buffers; and transceiving circuitry for transmitting information stored in the one or more transmission buffers over the shared radio channel via the adaptive antenna array to the multiple mobile radios in the cell during the same predetermined transmission time interval using multiple antenna beams to spread out the interference caused by the transmission, as taught by Choi, in order to provide an adaptive interference suppression receiver that has an excellent data detection performance even in the multipath fading channel environment.

Avidor and Choi, in combination, fails to teaches a channel scheduler for selecting multiple mobile radios to receive a transmission over a shared radio channel during a predetermined transmission time interval.

However, Walton teaches a channel scheduler for selecting multiple mobile radios to receive a transmission over a shared radio channel during a predetermined transmission time interval (col. 10 lines 19-28). Therefore, it is obvious to one of

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ordinary skill in the art at the time the invention was made to incorporate the disclosing of Walton into view of Avidor and Choi, in order to schedule terminals for data transmission on the downlink and/or uplink based on the spatial and/or frequency "signatures" of the terminals and allocating resources in multiple-input multiple-output communication systems that utilize orthogonal frequency division multiplexing (i.e., MIMO-OFDM systems).

Consider claim 17, Choi further teaches the interference from the transmission appears as white noise in time and in space in the cell and one mobile radio is selected for one of the antenna beams (page 1 [0008]).

Consider claim 18, Choi further teaches the white noise is white additive Gaussian noise (page 1 [0008]).

Consider claim 19, Choi further teaches the radio channel is a high speed-downlink shared channel (HS-DSCH) (page 1 [0010] and page 10 [0130]).

Consider claim 20, Choi further teaches a channel quality controller for receiving reports from mobile radios of a detected channel quality of a pilot signal transmitted in the cell (page 7 [0083]), wherein the scheduler is configured to schedule transmissions to multiple mobile radios over the HS-DSCH for each transmission time interval based

on the received reports (page 1 [0010]).

Consider claim 21, Walton further teaches the scheduler is configured to select one of the mobile radios to receive a transmission from one of the antenna beams based on the received reports, and wherein the transceiving circuitry is configured to transmit the information over the HS-DSCH using each antenna beam to each selected mobile radio during the predetermined transmission time interval (col. 40 line 60 through col. 41 line 12).

Consider claim 22, Choi further teaches the scheduler is configured to select an optimal coding and modulation scheme for each scheduled mobile radio to achieve an acceptable error rate (page 10 [0121] through [0122]).

Consider claim 23, Walton further teaches the scheduler is configured to split the radio resources of the shared radio channel among the multiple mobile radios using a resource allocation scheme (col. 40 lines 12-23).

Consider claim 24, Walton further teaches the radio communications system is a CDMA-based system here radio channel resources include scrambling codes, each scrambling code having an associated channelization code tree, and wherein the resource allocation scheme includes allocating a scrambling code to the shared radio channel and allocating one or more different channelization codes associated with the

shared radio channel scrambling code to each antenna beam during the predetermined transmission time interval (col. 4 line 60 through col. 5 line 11).

Consider claim 25, Walton further teaches the radio communications system is a CDMA-based system where radio channel resources include scrambling codes, each scrambling code having an associated channelization code tree, and wherein the resource allocation scheme includes transmission allocating a different scrambling code for each antenna beam during the predetermined time interval (col. 40 line 60 through col. 41 line 12).

Consider claim 26, Walton further teaches the resource allocation scheme includes dividing the shared radio channel resources evenly between the multiple mobile radios (col. 23 lines 40-44).

Consider claim 27, Walton further teaches the resource allocation scheme includes dividing the shared radio channel resources in proportion to each mobile radio's reported detected channel quality (col. 7 lines 30-39).

Consider claim 28, Walton further teaches the resource allocation scheme includes dividing the shared channel resources using a non-linear relationship between two or more of the following: amount of channel resources, throughput, quality of

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service, and detected channel quality (col. 10 lines 40-45).

Consider claim 29, Walton further teaches the non-linear relationship is stored in a look-up table (col. 49 lines 25-45).

Consider claim 30, Walton further teaches the scheduler is configured to: detect a change in radio channel conditions (col. 50 lines 25-28), and update the look-up table based on changed radio channel conditions (col. 29 lines 24-37).

Consider claim 31, Walton further teaches the transmission via the adaptive antenna array to multiple mobile radios in the cell during the same predetermined transmission time interval using multiple antenna beams prevents a flashlight effect from disrupting the channel quality detection performed by the mobile radios (col. 49 lines 14-24).

Consider claim 32, Avidor further teaches the multiple antennas include an adaptive antenna array (col. 17 lines 32-35).

Consider claim 33, Choi further teaches the multiple antennas include transmit diversity antennas (page 1 [0009]).

Consider claim 34, Avidor teaches a method for use in a radio communications system with a radio base station that includes multiple antennas associated with a cell, comprising: transmitting information over the shared radio channel using one beam to one or more mobile radios following the beam transmission sequence order for multiple predetermined time intervals (col. 4 lines 36-49).

Avidor does not explicitly show that performing beam switching in accordance with the beam transmission sequence order after multiple transmission time intervals so that the flashlight effect is avoided.

In the same field of endeavor, Choi teaches performing beam switching in accordance with the beam transmission sequence order after multiple transmission time intervals so that the flashlight effect is avoided (page 10 [0122]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use, performing beam switching in accordance with the beam transmission sequence order after multiple transmission time intervals so that the flashlight effect is avoided, as taught by Choi, in order to provide an adaptive interference suppression receiver that has an excellent data detection performance even in the multipath fading channel environment.

Avidor and Choi, in combination, fails to teaches selecting mobile radios to receive a transmission over a shared radio channel using a beam transmission sequence order.

However, Walton teaches selecting mobile radios to receive a transmission over a shared radio channel using a beam transmission sequence order (col. 9 lines 36-47).

Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Walton into view of Avidor and Choi, in order to schedule terminals for data transmission on the downlink and/or uplink based on the spatial and/or frequency "signatures" of the terminals and allocating resources in multiple-input multiple-output communication systems that utilize orthogonal frequency division multiplexing (i.e., MIMO-OFDM systems).

Consider claim 35, Choi further teaches the interference from the transmission appears as white noise in time and in space (page 1 [0008] through [0010]).

Consider claim 36, Choi further teaches the shared radio channel is a high speed-downlink shared channel (HS-DSCH) (page 1 [0010] and page 10 [0130]).

Consider claim 37, Choi further teaches receiving reports from mobile radios of a detected channel quality of a pilot signal transmitted in the cell (page 7 [0083]), and scheduling transmissions to one of the mobile radios over the HS-DSCH for more than one transmission time interval in accordance with the beam transmission sequence based on the received reports (page 1 [0010]).

### ***Conclusion***

6. Any response to this action should be mailed to:

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Commissioner for Patents

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Facsimile responses should be faxed to:

(571) 273-8300

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401 Dulany Street

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is (571) 272-8329. The examiner can normally be reached on 8:00Am - 5:00Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Maung Nay A. can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.



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Information Consider the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tuan Nguyen  
Examiner  
Art Unit 2618

  
**NAY MAUNG**  
**SUPERVISORY PATENT EXAMINER**